Perception of Foreign Accents Over Time

Shawn Weil
Department of Psychology
Language Perception Laboratory

CogFest 2000
March 10, 2000
The Phenomenon

When people encounter non-native speakers of their native language, they often report understanding them better a few moments into the conversation compared to the beginning of the conversation. People “tune in” to the accent.

Occurs:
- In the classroom
- In businesses
- In government
Questions

1) How does listening to a foreign accent affect speech comprehension?
   - Previous Research

2) How does comprehension change as a function of short term experience?
   Do our intuitions ring true?
   - Current Research

3) What are the underlying causes of this predicted change? Is there something special about accents versus other degraded speech (such as speech in noise)?
   - Future Research
What is a Foreign Accent?

- Articulatory parameters for one language encroach on speech production in a second language. The result is speech in the second language that deviates predictably and non-pathologically from standard pronunciation.

- Variations include “phone substitutions, phonetic distortions, and non-native prosodic patterns.” (Munro and Derwing, 1995; p. 302).
The Rationale

♦ Intuitively plausible phenomenon that has not been studied experimentally.
♦ Process that occurs everyday in academia and business. Could affect policy decisions.
♦ Implications for theories of speaker normalization. (i.e. Nygaard & Pisoni, 1998). Is foreign accented speech the “extreme case” of speaker variability?
The Literature

Studies in the ESL & Language Learning literature.

Investigated static aspects of accent compensation; immediate effects on comprehension.

**Conclusion:**

*The more noticeable an accent is, the lower the performance on tasks designed to gauge intelligibility.*
A Few Definitions

*Munro and Derwing (1995)*

1. Intelligibility: “The extent to which an utterance is actually understood.” - Accuracy

2. Comprehensibility “...listeners’ perceptions of difficulty in understanding particular utterances.” - Reaction Time (RT) or Subjective Rating

3. Accentedness: “...how strong the talker’s foreign accent is perceived to be.” - Subjective Rating
Many aspects of speech affect comprehensibility.

Formula for comprehensibility:
\[
C = p_\alpha + g_\beta + f_1\gamma + f_2\delta + f_3\epsilon \ldots f_l\zeta + s_\eta \ldots
\]

Accentedness affects comprehensibility in a monotonic, non-linear fashion. 
\((r \approx .85)\)

Subjective rating task

<table>
<thead>
<tr>
<th>Accent Severity</th>
<th>Comprehensibility Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td>Severe</td>
<td>Difficult</td>
</tr>
<tr>
<td>No Accent</td>
<td>Easy</td>
</tr>
</tbody>
</table>

Approximate Results
Munro and Derwing (1995)

**Task:** T/F Decision task on simple statements spoken by foreign accented speakers (FAS).

**Dependent Variable:** Transcription accuracy, T/F accuracy, reaction time (RT)

**Results:** Monotonic relationship between accentedness and comprehensibility, $(r = .624)$. Transcription accuracy 95%.
Task: Mispronunciation detection

Dependent Variable: RT, accuracy.

Results: Subjects had lower accuracy for accented speakers compared to non-accented speakers. There is a monotonic relationship between accent severity and accuracy/RT.

Conclusions: Accentedness affects both comprehensibility and intelligibility.

Problems: An accented mispronunciation may sound like a real word.
Conclusions from the Literature

♦ There is some kind of positive monotonic relationship between accentedness and comprehensibility.
♦ All studies were static. Improvement with time and experience not addressed.
♦ Familiarity and exposure to accent indirectly addressed. Some evidence that familiarity with an accent improves comprehensibility (Gass & Varonis, 1984).
Current Study

♦ Designed to measure changes in comprehension with experience.

♦ Measures comprehensibility during three single session Testing Phases (TP).

♦ Manipulates experience by means of a Learning Phase (LP).
Accent Rating

♦ **Task:** Native English speakers judge accentedness of native and non-native speakers from various countries via a rating task (1 = Very Noticeable Accent; 7 = What Accent?).

♦ **Stim:** Short passage read by 4 native and 10 non-native speakers.

♦ **Results:** Mean accent rating = 3.8; Range = 1.7—6.9

♦ Individuals having accents ranked most and least noticeable were used in further experiments.
Testing Phase (TP)

♦ **Task:** Lexical Decision Task

♦ **Stim:** Words selected from (Kučera & Francis, 1967). Balanced for frequency (high and low) and number of syllables (one and two). Non-words created by switching phonemes between real words.

♦ Stim were always spoken by an accented speaker.

♦ Three TPs: One at the beginning, one in the middle, and one at the end.
Learning Phase (LP)

♦ **Task:** Listen to or Read a folktale; answer some comprehension questions.

♦ **Presentation:** (between subjects)
1. Accented Speaker — Aural presentation using same speaker as TP.

♦ Two LPs between TPs.
Expected Results

♦ Over the course of the experiment, both comprehensibility (measured by RT) and intelligibility (measured by accuracy) should improve for the Accented Speaker condition compared to both the Non-Accented and Visual Presentation conditions.

♦ Between subjects, RT for particular items will decrease as a function of TP session in the FAS condition.
Actual Results

♦ Subjects:

N = 23
Native English Speakers from Ohio
90% response trials—eliminate 3 Ss

Descriptive Stats:

Overall PC = .72; std .03
Overall RT = 1460 ms; std 186 ms
% Hit = .82; % FA = .36

No difference in PC or RT due to amount or type of experience.

Conclusion:

Null Results
What Went Wrong?

- People were biased to responding "word."
  
  Word Responses: 59%
  Non-Word Responses: 40%

- Similar problem as Schmid & Yeni-Komshian:
  
  Accent + Non-Word = Real Word.
What to do now?

⇒ Take Phonetic Inventory of Items always or seldom identified correctly to see if there are problem phonemes.

Misidentified items contained a higher number of /r/, /l/, /b/, & /ɔ/ and lower number of /tʃ/, /i/, & /ə/ compared to the perfectly identified items.

⇒ Change the testing task to reduce the bias towards choosing “word.”

Semantic Categorization Task
Summary

♦ Previous studies have shown a relationship between accentedness and comprehensibility.

♦ Current research attempts to extend this research to show how comprehensibility changes over time; how they “tune in.”
Future Research

♦ What effect does changing the length or type of LP have.
♦ This describes the “what” but not the “why.” Is this a perceptual shift, or a criteria shift? Different TP tasks will investigate different processes.
♦ How does this relate to normal speaker normalization research? Is it just the extreme, as Nygaard has proposed, or is there a qualitative difference as well. Can accent and person be separated?
For More Information…

Name: Shawn Weil
Department of Psychology
Cognitive/Experimental Area
E-mail: weil.17@osu.edu
Web Page: http://lpl.psy.ohio-state.edu/
          http://home.columbus.rr.com/berenpage/Shawn/

A copy of this poster is located on the LPL Web Site